EMBEDDEDNESS, COOPERATION AND POPULAR-ECONOMY FIRMS IN THE INFORMAL SECTOR[a]

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REVISED VERSION[d]
October 1998

Abstract

This paper is motivated by empirical observations on popular-economy firms (PEFs) in the informal sector of Santiago de Chile. These are labor-managed firms embedded in popular milieu where cooperation between their members plays a central role. This paper develops a (partial equilibrium) microeconomic theory of PEFs. First, it endogeneizes the level of cooperation between the workers. Second, it develops a static and a dynamic model to analyze whether embeddedness influences the behavior of the PEF. Embeddedness is assumed to be captured by three different characteristics suggested by the empirical observations. Most of them influence the employment and income levels in the PEF.

keywords : embeddedness, cooperation, labor-managed firms, Popular-economy firm
JEL classification numbers : J23-J33-O17-P13.

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[a] This research has been supported by a grant "Actions de Recherche Concertées" n°93/98-162 of the Ministery of Scientific Research of the Belgian French Speaking Community. An earlier version of this paper has benefited from the comments of F. Spinnewyn and J.H. Drèze. The comments of P. Dehez and two anonymous referees on this version are gratefully acknowledged. The usual caveat applies.

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1. INTRODUCTION

It is admitted today that subsistence in the poor areas of Third World cities is possible, partly, thanks to the development of a wide range of small economic activities created by the people themselves (retail shops, craftsmen, services...) outside formal economic channels. This phenomenon has been referred to in recent economic and sociological writings as 'informal sector', 'underground economy' or 'survival strategies'. This informal sector is clearly inserted in a popular *milieu* (in Chile, “poblaciones”, in Argentina, “villas miseria”, in Brazil, “favelas”). Following an inductive approach, some authors have argued that more consideration should be given to the embeddedness of these 'informal' economic activities in their social, political, economic, and cultural reality (Dia, 1991, Hugon, 1996, Rogaly, 1997). As these authors, we are concerned with the question : Does it matter whether the 'informal sector' is embedded in a popular *milieu*? However, our approach is quite different. Starting from 'stylized facts', we develop a microeconomic model to derive the possible implications of embeddedness. No attempt is made to answer such a broad question comprehensively. First, we only consider some aspects of embeddedness. Second, we only deal with a specific segment of the 'informal sector', namely 'popular-economy firms' (PEFs). These are (small) groups of workers organized as labor-managed firms (LMFs).

This paper first argues that the 'environment' in which an organization is embedded can influence the type of information agents have and can explain the existence of social norms. Then, we summarize the relevant information contained in a survey on PEFs in Santiago de Chile and in a larger survey about 'popular-economy initiatives' in the same area. Some 'stylized facts' emerge about the organizational structure of PEFs (ownership, income inequalities, degree of cooperation between workers,…) and the link between these firms and local social networks. The rest of the paper develops a microeconomic theory of PEFs. The models are based on assumptions motivated by these stylized facts. From these, it is clearly not possible to derive a unique and non controversial set of attributes characterizing embeddedness in a popular *milieu*. Yet, these surveys *suggest* various plausible assumptions about these attributes, whose consequences on the behavior of the firm seem worthwhile to analyze. Although our analysis is limited to the embeddedness of LMFs in a popular *milieu* and is developed at a partial equilibrium level only, we hope to contribute to the debate about the possible importance of embeddedness.

This paper develops both a static and a dynamic model. In the static setting, we start from the literature on the LMF where the incumbent workers' expected utility is maximized taking into account the risk of a layoff (the so-called 'ex-ante egalitarian cooperative')[1]. As Spinnewyn and

Svejnar (1990) and Georges (1994), we take advantage of the close connection between the modeling of the LMF and the search for efficient contracts in unionized profit-maximizing firms (PMFs). The static model extends this literature in two directions. First, it endogeneizes the level of cooperation between the members and the workers entering the LMF. This extension is motivated by the observation of a high level of cooperation between workers in PEFs. The model shows that the degree of cooperation between members and newcomers is much higher in such an organization than in a PMF with so-called 'insiders'. Second, we introduce two possible dimensions of embeddedness to see whether it influences the behavior of the firm. Assuming that the hypothesis of symmetric information is more plausible in a dense social network than otherwise, we show that the risk of a layoff would be efficiently shared between the members of a PEF. Next, assuming that embeddedness in a popular *milieu* favors egalitarianism, we postulate that incumbent and entrant workers should be equally paid and analyze the behavior of the PEF under this constraint. These two cases are contrasted with the ones where risk-sharing is ruled out and where entrants are paid their reservation wage.

In a dynamic model, we analyze possible consequences of embeddedness on membership formation. The surveys point to the existence of close links between the PEF and a preexisting community and/or a local group. Therefore, we assume that the initial number of members is concerned with the stream of income but also with the time path of employment and membership levels. In steady state, it is shown that all members are employed, some new workers are hired to replace quits and are immediately considered as members. Moreover, in steady state the marginal effect of employment on income per worker is negative. This solution therefore lies between the employment level that maximizes value-added per worker (see e.g. Vanek, 1970) and the extreme case where the employment level is maximized (Kahana and Nitzan, 1989). The dynamic behavior of the PEF is also studied.

The literature has since a long time been concerned with the so-called ‘perverse response’ of the LMF (according to which output and labor demand are inversely related to the output price). This paper shows that the this ‘perverse response’ is not systematically observed.

This paper is organized in the following way. Section 2 develops the concept of embeddedness. Section 3 summarizes the empirical observations on PEFs. Section 4 deals with the static model and section 5 with its dynamic extension. Section 6 summarizes the paper and concludes.

2. POPULAR ECONOMY AND EMBEDDEDNESS

The informal sector is a growing reality in Third world cities. For some, this informal sector is the manifestation of a universal tendency towards entrepreneurship, of a kind of 'barefoot capitalism' (De Soto, 1987). For others, these economic activities are archaic and therefore have to disappear over time or are, at best, in need of transformation (Tokman, 1990). Recent studies in economic micro-organizations of Third World countries highlight the fact that more consideration must be given to the 'embeddedness' of these economic activities in their social, political, economic, and cultural reality (Dia, 1991, Hugon, 1996, Rogaly, 1997). This means that in order to understand these diverse informal forms of economic activity, one must refer to the social structures and the relational networks with which they interact (Polanyi, 1944, Granovetter, 1985). Indeed, economic organizations are constructed by individuals whose actions are influenced, i.e. both facilitated and constrained, by the structures and resources[2] available in the social environment in which they are embedded (Granovetter, 1992).

Beyond their heterogeneity, the informal economic activities share the context in which they are embedded, the popular *milieu*. This *milieu* is made up of all the inhabitants of peripheral urban areas who, mostly under precarious economic conditions, develop relationships and modes of conduct in reference to that space. Sociological studies show that despite the heterogeneity of the population in these peripheral quarters, these areas have become a genuine identificatory reference (Salazar, 1991). For this reason, the expression 'popular economy' is being increasingly adopted in order to highlight the usually neglected embeddedness of these organizations (Nyssens, 1994, 1997). The popular economy is therefore the set of different activities developed by the popular sectors to ensure their subsistence and satisfy their economic needs (Razeto, 1991).

Razeto proposes two criteria to classify these activities. On the one hand, there are several different forms of organization : popular-economy organizations, family businesses, individual initiatives... For Razeto (1991),

"popular-economy organizations (PEOs) are groups of people in a given neighborhood organized to seek out ways of resolving in solidarity the members' needs in the areas of consumption, production and the distribution of goods and services" (p. 84)

On the other hand, within each of these modes of organization, there are several strongly differentiated levels of development, ranging from survival-oriented activities to activities witnessing substantial growth. Table 1 presents such a classification. To provide more intuition, each cell of the table contains an example.

Embedding a socio-economic organization in its social and cultural environment is to a large extent only useful if this provides a better understanding of its functioning. This paper argues that this is indeed often the case. To develop a rigorous argumentation, we focus on a *specific* segment of the popular economy, namely the popular-economy organizations involved in production, called *popular economy firms* (PEFs).

A preliminary step is to specify how an economic model could deal with embeddedness. First, the relational networks in which the organization is located can influence the information available to the agents. The kind of assumption made (symmetric vs. asymmetric information, the type of asymmetry) can reflect the social and cultural context in which the organization is embedded.

Introducing the influence of norms upon agents' behavior is a second way of modeling the embeddedness of economic organizations. Norms are a set of rules (legal, social, moral, etc.) shared by a group of people. They influence the choices made by the individual members of this group. Norms emerge over time in a given social, political, economic, and cultural reality[3]. Norms can impose a *constraint* on the agents' choices. The equality of wages between incumbent and entrant workers (the refusal of two-tier contracts) may be viewed as the consequence of a social norm of fairness (Elster, 1989, Fehr and Kirchsteiger, 1994). Introducing endogenous *variables* capturing a collective component is another approach. Simon (1993) argues that embeddedness in social networks provides perhaps the most important rationale for introducing non-economic variables into objective functions, especially variables reflecting some kind of altruism. For example, within the theory of the LMF, Kahana and Nitzan (1989) have given reasons why the level of employment could have a positive effect on the utility of the incumbent workers. We shall explore some of these paths in sections 4 and 5.

3. POPULAR ECONOMY FIRMS (PEFs) IN SANTIAGO (CHILE) : SOME BASIC FACTS

This section argues that a large part of PEFs can be considered as labor-managed firms. It also characterizes the environment in which the popular economy and therefore PEFs are embedded. This section is based on two sets of data collected in the Santiago metropolitan area : A random sample survey of 50 PEFs supported by the Program of Labor Economics in 1993 (Larraechea, 1994), and a survey on the 4000 popular economy initiatives (popular economy organizations, family businesses...) supported by a group of Non Governmental Organizations (NGOs) (PET, 1992).[4]

Larraechea (1994) indicates that only 11% of the sampled workers declare that they are in an employer-employee relation. 85% consider that they are "members" of an enterprise owned by the workers themselves. This huge majority of "members" motivates our interpretation of PEFs as LMFs inserted in the popular economy. Moreover, 87% of the workers evaluated the state of cooperation between workers to be "good" or "very good"[5].

What is the level of development of these PEFs? The data collected by Larraechea (1994) show that the average size of PEFs was 6 workers and their average age 9 years. Furthermore, the mean of a PEF worker's monthly income was US$ 341. This is relatively high compared to the alternatives available to workers in the 'formal' economy. This income level corresponds to the earnings of an employee with a post-high school degree, while only 33% of the workers in the sample actually reached this education level. This income is a bit lower than that of a technician in the formal sector, while most of the PEF members could only apply for a blue-collar job. The survey also shows that income differentials are twice lower in PEFs than in PMFs in the Santiago area[6].

Larraechea's survey on PEFs gives information about the motivations of the firm to contract a new worker. For 64% of the firms, economic considerations are relevant. 31% of the PEFs underlie motivations of solidarity (to create a job for an unemployed person) or ideological motivations (to contract a worker who shares the same values).

The 1992 PET survey of 4000 initiatives supported by NGOs gives information about the type of links between members in the popular economy (Table 2). Notice that 40% of the initiatives are communautarian and 18% associative. The former, but not the latter, grew out of community circles, indicating that there were strong links among members even before specific economic initiatives were undertaken. 34% are family microentreprises. The same survey shows also that 60% of the initiatives participated in some local structure of coordination of popular economic initiatives. This suggests that these organizations are highly embedded in local social networks[7].

These observations suggest a set of assumptions on which a theory of the PEF could be elaborated. First, the PEF should be viewed as an LMF. Second, it can be argued that the assumption of symmetric information is plausible since typically the PEF is so closely connected to preexisting groups and embedded in local social networks. Third, it is plausible that issues such as the time profile of the size of the PEF or the rules governing membership formation matters for the current members of a PEF. Finally, the relatively weak income inequality within PEFs should also be taken into account in our theory. Although these assumptions are only suggested by the available observation, it seems worthwhile to analyze their implications at a theoretical level and to confront them with alternative assumptions (to see whether embeddedness matters). Sections 4 and 5 develop this analysis.

4. A STATIC MODEL OF THE PEF

Assumptions and notations

Let $y = (y_1,...,y_G)$ be the vector of outputs and nonlabor inputs of a LMF (y_g is positive in the case of an output and negative in the case of an input). Let L be homogeneous labor measured in efficiency units. The feasible production set is denoted by $Y \subset R^{G+1}$. We assume that the LMF faces given output and input prices, $p = (p_1,...,p_G)$. Whatever the value of L, the LMF is assumed to maximize value-added

$$f(L) = \underset{y \in (y,L) \in Y}{Max}\, py' \tag{1}$$

By assumption, for a given L, the corresponding subset of Y is compact, problem (1) has a solution. If this subset varies continuously with L, so does $f(L)$. We assume that Y is convex, so that $f(L)$ is concave.

We assume that the number of hours each laborer works is identical and fixed after normalization to 1. In addition, as in Lindbeck and Snower (1988), we distinguish the number of employed members ("insiders" or "incumbent workers"), L_i, and the number of entrants, L_e, where entrants are "outsiders" who enter the firm. The number of employed insiders, L_i, has to be lower or equal to the initial number n of incumbent workers. In this section, n is exogenous (this assumption is relaxed in the next section). We assume that there is no upper bound on the number of entrants, L_e,. Let a_i and a_e be endogenous parameters that transform a given number of workers (or hours of work) into a quantity of labor input measured in efficiency units. Hence, $L = a_i.L_i+a_e.L_e$. We assume that a_i and a_e are nonnegative and bounded from above (say, $a_i \leq 1$, $a_e \leq 1$). As in Lindbeck and Snower (1988), a_i and a_e can be seen as the level of cooperation respectively between insiders and between insiders and entrants. As in Lindbeck and Snower (1988), insiders, the "experienced" workers, are the only ones who are able to engage in cooperation activities. Therefore, it is assumed that both a_i and a_e are under the control of the incumbent workers. These workers can incur a disutility from their cooperation activities with entrants. This approach is *not* developed in this paper (but well in Nyssens, 1994). In this paper, for expository reasons, we simply assume that these cooperation activities involve a cost of training which is proportional to the number of entrants and to the degree of cooperation a_e. In this way, cooperating with entrants is seen as creating a loss of value added. As will soon be clear, this approach leads to easily interpretable results. To simplify the exposition, cooperation between insiders is costless. Hence, $a_i = 1$.

If employed, the incumbent workers' income is C_1. Their utility is $U(C_1)$. We assume $U'>0$ and $U''<0$. If fired, incumbent workers are assumed to work in another firm, where they earn an exogenous wage w. w is assumed to be lower than the maximum possible value-added per worker, i.e. $max_L\ f(L)/L$. This assumption is compatible with the results of Larraechea (1994) mentioned in section 3. We assume that workers have no access to financial markets. Hence, risk-averse workers prefer a labor contract that insure them against income fluctuation. In a context of symmetric information (about this assumption, see Section 3), we will consider the possibility that the LMF pays a compensation C_2 to laid-off insiders. The results with and without this compensation will be contrasted. The possibility of an insurance mechanism establishes a link between our model and the implicit contract approach (see Rosen, 1985, for a survey). One difference should nevertheless be emphasized, namely that we envisage risk-sharing between employed and laid-off insiders for a *given* 'state of the world' i.e. for a given function f. Put differently, the LMF faces a budget constraint conditional on the realization of f.[8] Let C_e denote the compensation paid to entrants ($C_e \geq w$).

In a seminal paper, Law (1977) assumed that the number of employed as well as income per worker enter the objective function of a LMF. In Steinherr and Thisse (1979) and several more recent papers, the probability of being laid off is by assumption the same for each worker. Therefore, it is rational to assume that the LMF maximizes the expected utility of a representative member. As long as the initial number of insiders, n, is exogenous, the maximization of a utilitarian objective is strictly equivalent. In this paper, we adopt the latter approach and assume that the objective function of the LMF writes :

$$u(C_1, L_i, n) = L_i\, U(C_1) + (n - L_i)\, U(C_2 + w), \quad U' > 0, U'' < 0.$$

This objective function clearly introduces a trade-off between the income and employment levels.

This objective is maximized under a set of constraints. In addition to the ones already mentioned, one constraint says that earnings and compensations paid cannot exceed the value-added generated by the production activities minus the loss due to cooperation :

$$C_1.L_i + C_2.(n - L_i) + C_e.L_e \leq f(a_i.L_i + a_e.L_e) - k.a_e.L_e \,, \tag{2}$$

where k is the constant nonnegative marginal cost of cooperation. This constraint will always be binding. It can be seen as a zero-isoprofit function. Therefore, our problem can be reinterpreted as the search for an efficient contract in a unionized PMF where profits are fixed to zero[9].

The model

The problem of the PEF can be formulated as follows :

$$\underset{\substack{L_i, C_1, C_2, \\ L_e, C_e, a_e}}{Max} \; L_i U(C_1) + (n - L_i) U(C_2 + w) \tag{3}$$

subject to

$$f(L_i + a_e.L_e) - C_1.L_i - C_2.(n - L_i) - C_e.L_e - k.a_e.L_e \geq 0 \quad [\zeta] \tag{2}$$

$$1 - a_e \geq 0 \quad [\lambda] \tag{4}$$

$$C_e - w \geq 0 \quad [\nu] \tag{5}$$

$$n - L_i \geq 0 \quad [\xi] \tag{6}$$

The first-order conditions of this problem are presented in Appendix 1.

To analyze these conditions, we first assume that n is large enough, so that maintaining a job for each insider is not desirable (given that C_1 must be higher than or equal to w). In that case, whatever the value of a_e there will be no entrants since hiring outsiders implies a cooperation cost. The case with and without layoff payments will be contrasted. We will next consider a small enough membership n, where hiring outsiders will be optimal. The model (2)-(6) implies immediately that $C_e = w$. We deal with this case but also with the one of the egalitarian PEF where an additional constraint, $C_1 = C_e$, applies as a consequence of a social norm. Between these high and low values of n, a third region will appear where all insiders keep their job and no outsider enters the firm. This decomposition in three regions is also present in the modeling of LMFs in Spinnewyn and Svejnar (1990). It is a standard result in PMFs, too (see, e.g., Carruth and Oswald, 1987 and Lindbeck and Snower, 1988).

(i) The case where some insiders are laid off

For sufficiently large values of n, we know that at the optimum, some incumbent workers will be fired and no outsider will enter the firm. The first appendix shows that at the optimum $C_1 = C_2 + w$. Therefore the utility level of employed insiders equals the one of the laid-off ones (this is the case of the ex-post egalitarian LMF)[10]. It follows that $f'(L_i) = w$. This means that the utilization of labor is efficient. Furthermore, the level of C_2 is given by :

$$C_2 = (1/n)\left[f(f'^{-1}(w)) - w f'^{-1}(w) \right] \tag{7}$$

which is positive[11]. Hence, $C_1 > w$.

The properties $C_1 = C_2 + w$ and $f'(L_i) = w$ are also found in the implicit contract theory literature under symmetric information (see Rosen, 1985) where risks are efficiently shared between a private firm and a pool of risk averse workers endowed with a utility function equivalent to the one assumed here. Yet, the assumption of symmetric information looks more plausible in a LMF embedded in dense social networks than in other types of firms.

The optimal solution (7), $C_1 = C_2 + w$, $f'(L_i) = w$, $L_e = 0$ is found as long as $n \geq f'^{-1}(w)$. In Figure 1, this boundary value is denoted by n_A and A is the optimal solution.

INSERT FIGURE 1 APPROXIMATELY HERE.

If, for whatever reason, laid-off insiders cannot be compensated ($C_2 = 0$), one easily derives the following equality from (A1) and (A2) in the first appendix :

$$-\frac{U(C_1) - U(w)}{U'(C_1)} = f'(L_i) - C_1 \tag{8}$$

which simply says that (C_1, L_i) is on the contract curve. This curve has the same interpretation as in Mac Donald and Solow (1981). It is the set of tangency points between isoutility and isoprofit curves. When C_2 is fixed to zero, the contract curve starts at the competitive equilibrium ($f'(L_i) = w$) and is upward sloping (see the curve CC' in Figure 1). The optimal (C_1, L_i) is at the intersection of the contract curve and the budget constraint (2) which simply writes $C_1 = f(L_i)/L_i$. This solution is indicated by point B in Figure 1. It is the optimal one as long as $n > n_B$ in Figure 1. As can be seen from this figure, the employment level is lower when C_2 is positive : $n_A < n_B$. If compensating laid off insiders is impossible, the only way risk averse workers can partially insure against the utility loss of layoff is by hiring a number of incumbent workers in excess to what would be efficient (on this issue, see also Rosen, 1985). It is immediately seen that risk averse insiders prefer that ex-post utility be completely insured by the PEF ($C_2 > 0$).

(ii) The case where outsiders are hired

If the number of entrants, L_e, is positive, all insiders are necessarily employed ($L_i = n$). In addition, the marginal cost of hiring an outsider must be equal to its marginal productivity:

$$C_e + k\,a_e = a_e\, f'(n+a_e L_e), \tag{9}$$

where $C_e = w$. The latter is only positive if a_e, the degree of cooperation with entrants, is itself positive. However, if L_e is positive, cooperation has to be maximal ($a_e = 1$), a result in sharp contrast with the optimal behavior in PMFs with insiders (where the optimal value of a_e is its lower bound, see Lindbeck and Snower, 1988). This result is shown in Appendix 1[12] and is compatible with empirical observations (see Section 3).

The number of entrants, L_e, is given by (9) where $a_e = 1$. The total number of workers is denoted by n_C in figure 1, of which $n_C - n$ are entrant workers. The insiders wage is determined by the budget constraint (2) :

$$C_1 = w + k + (1/n)\left[f(f'^{-1}(w+k)) - (w+k)\, f'^{-1}(w+k) \right] \tag{10}$$

where the bracketed difference is positive[13] and therefore $C_1 > w+k$. In this case, the PEF implements a two-tier system where outsiders earn their reservation wage w and insiders benefit from a higher income defined by (10). The optimal solution defined by (10), $L_i = n$, $a_e = 1$, $C_e = w$ and $f'(n+L_e) = w + k$ is observed for all n lower than n_C.

The literature on union-firm bargaining has argued that two-tier systems are not often observed. This argument is presumably even more plausible in the case of a PEF (see Section 3). It is therefore necessary to consider another reference case where a strict equality between C_1 and C_e is imposed. Under this hypothesis, the budget constraint can be rewritten as :

$$C_1 = \frac{f(n+L_e) - kL_e}{n+L_e} \; . \tag{11}$$

This expression can be substituted in (9), taking into account that $a_e = 1$ and $C_e = C_1$. Carrying out the calculations yields :

$$f'(n+L_e) - \frac{f(n+L_e)}{n+L_e} = \frac{kn}{n+L_e}, \tag{12}$$

which is an implicit equation in L_e. Should k be zero, the solution to (19) would simply be the employment level that maximizes value-added per worker (point E in Figure 1), i.e. the optimum found in the first generation of literature on LMFs (see e.g. Vanek, 1970).

Let n_D be the solution of equation (12) for L_e equal to zero, i.e. let n_D be the solution of :

$$f'(n_D) - (f(n_D)/n_D) = k \; .$$

For all n lower than n_D, at the optimum, $L_i = n$, L_e solves (12), $C_1 = f'(n+L_e) - k$, $a_e = 1$ and $C_e = C_1$. Given that w is assumed to be lower than the maximum of $f(L)/L$, it is clear that C_1 is higher than w for sufficiently low values of k.

(iii) The intermediate case

Between the boundaries n_D or n_C and n_A or n_B, the number of insiders is such that each of them is employed in the PEF. No outsider enters the firm because the marginal increase of value-added they create is insufficient to compensate the marginal cost they impose to the PEF. Hence, $C_1 = f(n)/n$. Clearly, the range of values of n where this outcome is observed varies according to the assumptions made (a two-tier system or an egalitarian wage system where insiders and entrants are equally paid; the presence or the absence of a compensation to laid-off insiders).

Up to now, the possible consequences of embeddedness have been developed along two directions. First, embeddedness matters if, because it is located in a dense social network, information is symmetric and a PEF can insure laid-off insiders while another firm cannot[14]. If this condition is verified, everything else equal, the income of the laid-off workers will be higher and the employment level will be lower in the PEF. Second, if a dense social network favors income equality between insiders and entrants, the total level of employment (insiders + entrants) will be lower in a PEF compared to another LMF. This assertion holds if two-tier systems are implemented in the latter organization.

Before we envisage other dimensions of embeddedness in a dynamic setting, we show in appendix 2 that in many cases the PEF does not develop the so-called perverse response property which since a long time has worried the literature on LMFs. This perverse response is only observed in the case where $n < n_D$, insiders and entrants are equally paid and the marginal cost of cooperation, k, is sufficiently low.

5. A DYNAMIC MODEL OF THE PEF

Assumptions and notations

This section endogeneizes the number of members of the PEF, n. The appropriate setting to deal with this question is clearly dynamic. We are interested in the optimal path and steady state properties. Previous intertemporal models maximize the present value of income per worker (see Näslund, 1988, Caputo, 1992, Georges, 1994). Consequently, they ignore risk aversion and the possibility of layoffs. Therefore, in these papers, the employment level only influences preferences through its effect on income per worker. To avoid these limitations, this section assumes a utilitarian LMF (as in the static model). In each period t, the firm is concerned with the well-founded following objective :

$$u(C(t), L_i(t), n(t)) \equiv L_i(t)U(C(t)) + (n(t) - L_i(t))U(w), \qquad U' > 0, U'' < 0. \tag{13}$$

Due to space limitation, we cannot consider each of the hypotheses made in the previous section. We assume that laid-off insiders, if any, do not receive a compensation and we rule out two-tier wage systems (*C(t)* is the compensation paid to the insiders instructed to work and to the entrants, if any). The first assumption is not crucial since it will turn out that all insiders are employed in the neighborhood of the steady state. The latter assumption is motivated by the stylized facts summarized in section 3. Moreover, it makes a comparison with the traditional LMF literature easier.

We consider an infinite horizon model with forward-looking agents. In a continuous-time setting, the instantaneous objective (13) is integrated over a period $[0,+\infty)$. This means that the initial number of insiders *n(0)* is concerned with the stream of income *C(t)* but also with the time path of the insiders' employment and membership levels (respectively, L_i(t) and *n(t)*). The same assumption has sometimes been made for unions (see Kidd and Oswald, 1987, Jones, 1987, and Jones and McKenna, 1994). Yet, it seems more plausible in the case of an embedded PEF, where the links with a preexisting community and/or a local group appears very often (see Section 3).

Conditional on *n(0)*, the PEF chooses a time path for the numbers of insiders and entrants and for the cooperation level between insiders and entrants, a_e. The number of members, *n(t)*, is the state variable. Its level is influenced by a fourth control variable which measures the share of the laid-off insiders (respectively, of the entrants) who loose their membership (respectively, become a member of the PEF). More specifically, we assume that the equation of motion for the state variable (i.e. the membership formation rule) writes :

$$\dot{n}(t) \equiv \frac{dn}{dt} = -qn(t) + m(t)(1-q)\left[L_i(t) + L_e(t) - n(t)\right], \quad 0 \le m(t) \le 1, \tag{14}$$

where *m(t)* is a control variable and *q* is an exogenous and constant quit rate capturing relevant aspects in a dynamic setting such as mortality, migration or retirement[15] ($0<q<1$). The first expression on the right hand side of (14) means that the number of members decreases because of quits. The second expression captures the influence of layoffs and recruitments on membership. If L_i(t) < *n(t)*, what matters is the number of insiders who are fired and would otherwise have survived (and similarly when $L_e(t) > 0$). Notice that these flows are multiplied by the control *m(t)*. This implies that entries and exits are fixed by the PEF according to its own objective function. [16]

The model

The LMF in the present model solves the following dynamic problem :

$$\begin{aligned}
&\underset{L_i, L_e, a_e, m}{Max} \quad \int_0^{\infty} \left[L_i(t) U(C(t)) + (n(t) - L_i(t)) U(w) \right] e^{-rt} dt \\
&s.t. \quad C(t) = \varphi(L_i(t), L_e(t), a_e(t)) \equiv \frac{f(L_i(t) + a_e(t) L_e(t)) - k a_e(t) L_e(t)}{L_i(t) + L_e(t)} \\
&\qquad \dot{n}(t) = -qn(t) + m(t)(1-q)\left[L_i(t) + L_e(t) - n(t) \right], \\
&\qquad n(t) - L_i(t) \geq 0 \\
&\qquad 1 - a_e(t) \geq 0 \\
&\qquad 1 - m(t) \geq 0 \\
&\qquad n(0) = n_0 \\
&\qquad m(t), n(t), L_i(t), L_e(t), a_e(t) \geq 0
\end{aligned} \tag{15}$$

where n_0 is a given positive constant, r is the discount rate and *f(.)* is defined by (1). Any solution of (15) should meet the additional constraint $C \geq w$. To simplify the exposition, we shall not impose this inequality which adds little insight to this analysis.

The current-value Hamiltonian H and Lagrangian Λ associated with problem (15) are

$$\left.\begin{aligned}
&H(L_i, L_e, m, a_e, \gamma) \equiv L_i U(\varphi(L_i, L_e, a_e)) + (n - L_i) U(w) + \gamma\left[-qn + m(1-q)(L_i + L_e - n) \right] \\
&\Lambda(L_i, L_e, m, a_e, \gamma, \xi, \varsigma, \lambda) \equiv H(L_i, L_e, m, a_e, \gamma) + \xi(n - L_i) + \varsigma(1 - m) + \lambda(1 - a_e)
\end{aligned}\right\} \tag{16}$$

$\gamma, \xi, \varsigma, \lambda$ being time-dependent multipliers defined on R_+. The first-order conditions for maximizing Λ are presented in Appendix 3. Various properties are easily derived from these conditions. First, as in the static case, outsiders enter the firm if and only if all insiders are employed. Moreover, when outsiders enter the firm, the cooperation level, a_e, is equal to its upper bound (the proof of Appendix 1 is still valid here). Finally, the Lagrangian is linear in m. Therefore, $m = 0$ or $m = 1$.

Properties in steady state

Before we consider the dynamic behavior of the system, let us look at the steady state conditions. The $\dot{n} = 0$ condition implies that $m(1-q)(L_i + L_e - n) = q\,n$ or, if $0 < L_i < n$, $n = \frac{m(1-q)}{q + m(1-q)} L_i$. It is obvious that m cannot be zero. Hence, $m = 1$. Therefore, $n = (1-q)\,L_i$, which implies a contradiction, namely that $n < L_i$. Consequently, $L_i = n > 0$ and $L_e \geq 0$. The $\dot{n} = 0$ condition becomes then $m(1-q)L_e = q\,n$, which only makes sense if $m = 1$. Therefore, an entrant who is hired becomes immediately a member. Then,

$$L_e = \frac{q\,n}{(1-q)}. \tag{17}$$

In steady state, all insiders are employed and some outsiders are recruited to replace those who quit. The conclusion is therefore that only one of the three regimes found in the static model can be a steady state in a model with quits.[17] From this property and Appendix 3, the $\dot{\gamma} = 0$ condition can be written as an implicit equation in n :

$$-\frac{U(\varphi(n, \frac{qn}{1-q}, 1))}{n\,U'(\varphi(n, \frac{qn}{1-q}, 1))} = \frac{1+r}{1-q}\phi'(\frac{n}{1-q}) - r\frac{k}{\frac{n}{1-q}} \tag{18}$$

where $\phi(L_i + L_e) \equiv \frac{f(L_i + L_e)}{L_i + L_e}$. The left-hand side of (18) is negative and is simply the marginal rate of substitution between income (consumption) and membership (employment for the insiders) evaluated at the steady state. To see this, one has simply to differentiate expression (13) equal to a constant, keeping in mind that in a steady state $L_i = n$ and $C = \varphi(n, \frac{q\,n}{1-q}, 1)$. In the particular case where cooperation is costless ($k = 0$), the right-hand side of (18) has a straightforward interpretation. It is simply proportional to the marginal increase in income per worker as membership increases. So, (18) implies that in steady state the employment level (i.e. members plus entrants) is such that this marginal increase in income is negative. This property derives from the preferences of the LMF where the path of employment matters. In general, i.e. when $k > 0$, the marginal increase in income per worker is reduced because enlarging membership involves a cooperation cost.

The steady state defined by (17) and (18) is apparently similar to point B in Figure 1 (equation (8) of the static model). For, in both cases, the outcome is defined by the tangency point between a downward-sloping "iso-preference" curve and the value-added per head curve (corrected for the cooperation cost). However, the two solutions are genuinely different. In point B, conditional on *n,* some insiders are fired and for this very reason employment matters for the utilitarian PEF. Here, all insiders are employed, some outsiders are hired to replace quits and the employment level of insiders can matter to the utilitarian PEF because membership is now endogenous.

In the second part of Appendix 2, the so-called 'perverse response' of labor-managed firms is reconsidered in the steady state. It is shown that the 'perverse response' is not a general result. This 'perverse response' is more unlikely the more risk averse individuals are.

Dynamic analysis around the steady state

As far as the dynamic behavior of the system is concerned, three possible situations should be distinguished. They correspond to the three cases introduced in the static model of Section 4. We here focus on the dynamic behavior of the system in the neighborhood of a steady state (where, $L_i(t) = n(t)$ and $L_e(t) \geq 0$). Moreover, to simplify the analysis, we ignore cooperation costs ($k = 0$). Appendix 3 linearizes the equation of motion for $\gamma(t)$. Figure 2 gives the phase diagram corresponding to this linearized equation and the equation of motion (14). The $\dot{n}(t) = 0$ locus is upward-sloping and the $\dot{L}_e(t) = 0$ locus is downward-sloping. The arrows indicate directions of motion. There is therefore locally a unique saddle point path SS converging to the steady state. The dynamics of employment are implied by the path *SS.* Assume an initial level of membership such that all insiders are occupied, $n(0)$ in Figure 2. The initial value of L_e, $L_e(0)$, is read off SS. As $m = 1$ in a neighborhood of the steady state, these entrants become members. So, $n(t)$ starts increasing and the number of entrants becomes lower until the steady state is reached. There, the number of entrants is just enough to compensate quits.

INSERT FIGURES 2 AND 3 APPROXIMATELY HERE

Figure 3 illustrates the adjustment process after a (small) unanticipated permanent rise in the output price (p_0 in Appendix 2). Let us focus on the case where this rise increases employment.

The $\dot{n}(t) = 0$ locus is not affected and the $\dot{L}_e = 0$ locus shifts to the right. In Figure 3, the new saddle point path is SS. The initial equilibrium is $(n,L_e) = (N,l)$. The path of adjustment is composed of a jump at time *0* from *(N,l)* to *(N,l')* and a movement over time from this point to the new steady state *(N'',l'')*. Here again the initial rise in employment is made of entrants who become members, so that eventually the number of insiders is higher ($N'' > N$). So does the number of entrants ($l'' > l$).

In this dynamic setting, the possible consequences of embeddedness have been developed by endogeneizing membership formation. Since the links between the PEF and a preexisting community and/or a local group appears very often (see Section 3), we have assumed that the initial number of insiders *n(0)* is concerned with the stream of income but also with the time path of the insiders' employment and membership levels. In steady state, it is shown that all insiders are employed, some outsiders are hired to replace quits and membership adjusts immediately. The chosen objective function is such that in steady state the marginal effect of employment on income per worker is negative. This solution therefore lies between the employment level that maximizes value-added per worker (see e.g. Vanek, 1970) and the extreme case where the employment level is maximized (Kahana and Nitzan, 1989). Finally, there is locally a unique saddle point path converging to the steady state.

5. CONCLUSION

Would a better understanding of the relationship between the behavior of firms and their social and cultural environment throw light on the socio-economic performances of different regions or countries? A full answer to such a broad question is obviously beyond the scope of a single paper. Economists need tools to deal with this relationship between the behavior of economic agents and their social and cultural environment. We have argued that this environment could shape the type of information agents have and could explain the existence of social norms. So doing, we have introduced a link between this environment and concepts economists are able to manipulate. Next we have applied these ideas to a specific case. We have considered a particular segment of the informal sector in the slums of Santiago de Chile, namely popular-economic firms (PEFs). From surveys, it turns out that these are labor-managed firms embedded in local social networks, showing a small degree of income inequality and characterized by a high level of cooperation between workers. These 'stylized facts' have been used to formulate assumptions about the information set of the agents and about social norms.

Finally, we have developed a (partial equilibrium) microeconomic theory of the PEFs from which it can rigorously be deriveds whether these assumptions influence its behavior.

This analysis shows that embeddedness typically matters. First, it matters if, because it is located in a dense social network, information is symmetric and a PEF can insure laid-off insiders while another firm cannot. Under this assumption, everything else equal, the income of the laid-off workers will be higher and the employment level will be lower in the PEF. Second, if a dense social network favors income equality between insiders and entrants, the total level of employment (insiders + entrants) will be lower in a PEF compared to another LMF. This assertion holds if two-tier systems are implemented in the latter organization. Third, if the links between the PEF and a preexisting community and/or a local group implies that the initial number of members is concerned with the stream of income per worker but also with the time path of employment and membership levels, then the total level of employment lies between the employment level that maximizes value-added per worker and the extreme case where the employment level is maximized. An other interesting result is that the degree of cooperation with entrants is maximal in the PEF, while in PMFs, incumbent workers enhance their market power by developing the minimal level of cooperation with entrants (see Lindbeck and Snower, 1988).

Our analysis is limited to LMFs in a popular *milieu* and the stylized facts have only been suggested by data. Neverthless, we hope to have contributed to the debate about the possible importance of embeddedness on socio-economic organization. We suggest further analysis in two directions. First, we advocate that other dimensions of embeddedness should be studied with the standard tools of economics. The concept of 'social capital' is an example (see Harris and De Renzio, 1997). Second, appropriate data should be collected in order to test the predictions derived from this type of theoretical exercise.

APPENDIX 1

This appendix develops the first-order conditions of problem (3)-(6). Assuming $L_i>0$, $C_1>0$ and $C_e>0$, at an optimum there exists $\zeta \geq 0, \lambda \geq 0, \nu \geq 0, \xi \geq 0$ such that :

$$\left[U(C_1) - U(C_2 + w)\right] + \zeta\left[f'(L_i + a_e L_e) - C_1 + C_2\right] - \xi = 0 \tag{A1}$$

$$L_i U'(C_1) - \zeta L_i = 0 \tag{A2}$$

$$\left.\begin{array}{l} C_2\left[(n - L_i)U'(C_2 + w) - \zeta(n - L_i)\right] = 0 \\ (n - L_i)U'(C_2 + w) - \zeta(n - L_i) \leq 0 \end{array}\right\} \tag{A3}$$

$$\left.\begin{array}{l} L_e \zeta\left[a_e f'(L_i + a_e L_e) - C_e - k a_e \right] = 0 \\ a_e f'(L_i + a_e L_e) - C_e - k a_e \leq 0 \end{array}\right\} \tag{A4}$$

$$\nu - \zeta L_e = 0 \tag{A5}$$

$$\left.\begin{array}{l} a_e\left[\zeta(L_e f'(L_i + a_e L_e) - k L_e - \lambda\right] = 0 \\ \zeta(L_e f'(L_i + a_e L_e) - k L_e - \lambda \leq 0 \end{array}\right\} \tag{A6}$$

$$\left.\begin{array}{l} \lambda(1 - a_e) = 0 \\ \nu(C_e - w) = 0 \\ \xi(n - L_i) = 0 \end{array}\right\} \tag{A7}$$

(i) The case where some insiders are laid off

For sufficiently large values of n, at the optimum, $L_i<n$ and $L_e=0$. Equations (A2) can be rewritten as :

$$U'(C_1) - \zeta = 0 \tag{A8}$$

If $C_2 > 0$, equation (A3) is equivalent to :

$$U'(C_2 + w) - \zeta = 0 \tag{A9}$$

Hence, $C_1 = C_2 + w$. Substituting this result in equation (A1) yields $f'(L_i) = w$.

(ii) The case where outsiders are hired

To see that $a_e = 1$ when $L_e > 0$, we have to show that, for a given level of product $a_e L_e$, the cost of hiring entrants, $(C_e L_e + k\, a_e L_e)$, is decreasing when a_e increases. If C_e is exogenous ($C_e = w$) :

$$\left.\frac{d(C_e L_e + ka_e L_e)}{da_e}\right|_{a_e L_e} = kL_e + \left.\frac{dL_e}{da_e}\right|_{a_e L_e} (C_e + ka_e) = \frac{-L_e}{a_e} C_e \leq 0$$

It can easily be checked that the conclusion is the same if $C_e = C_1$. Notice that the level of cooperation is also maximized in PMFs where the firm chooses the level of a_e.

APPENDIX 2

The static model

The first generation of literature on LMFs shows that these firms perversely respond to price incentives i.e. labor demand is inversely related to the price of the output (see e.g. Ward, 1958). To simplify the exposition, let us consider a LMF producing a single output with two inputs only (labor and capital). We shall now consider how the PEF demand for labor varies with changes in its output price, when other prices are held constant. For this purpose, let $f(L) = p_o\ Q(L,K)\ -\ r\ K$ be the value-added function with p_o, the price of the output, K, the given stock of the capital, r, the cost of the capital and $Q(L,K)$, the production function assumed to be concave. $f(L)$ is then concave.

To analyze the impact of an increase of the output price, p_o, on the level of employment, (L_i, L_e), we shall successively consider each of the three cases introduced in the analysis. In a first step, we assume that the firm stays in the same region after the increase of the output price. We later relax this assumption.

(i) The case where some insiders are laid off

If C_2 is allowed to be positive, the number of workers is determined by $p_o Q_L(L_i, K) = w$. We can easily derive that $\frac{dL_i}{dp_o} = -\frac{Q_L(L_i,K)}{p_o Q_{LL}(L_i,K)}$ which is positive since Q is concave. If compensating laid-off insiders is impossible, the optimal solution is, as shown in the core of the text, at the intersection of the contract curve (8) and the budget constraint which can be written as $C_1 = (p_o Q(L_i,K)-rK)/L_i$. Differentiating totally these two equations yields :

$$\frac{[U(C_1) - U(w)]U''(C_1)}{[U'(C_1)]^2} dC_1 = p_o Q_{LL}(L_i,K) dL_i + Q_L(L_i,K) dp_o \qquad \text{(B1)}$$

$$dC_1 = (\frac{p_o Q_L(L_i,K)}{L_i} - \frac{p_o Q(L_i,K) - rk}{L_i^2})dL_i + \frac{Q(L_i,K)}{L_i} dp_o \qquad \text{(B2)}$$

The left-hand side of (B1), denoted *M* below, is negative since C_1 is greater than *w* and *U* is concave by hypothesis. Substituting dC_1 in (B1) gives :

$$\left[M(\frac{p_o Q_L(L_i,K)}{L_i} - \frac{p_o Q(L_i,K) - rk}{L_i^2}) - p_o Q_{LL}(L_i,K) \right] dL_i = \left[p_o Q_L(L_i,K) - M \frac{Q(L_i,K)}{L_i} \right] dp_o$$

The left-hand side is positive since we are in the region where $p_o Q_L(L_i,K)$ is lower than $(p_o Q(L_i,K)-rK)/L_i$ and $Q(L,K)$ is concave. The right-hand side is obviously positive. Therefore, when there is no insurance mechanism, the impact of an increase in the output price implies an increase in the number of employed insiders too.

(ii) The case where outsiders are hired

Two cases must be considered (with two-tier contracts and with an egalitarian wage system). If two-tier contracts are allowed, the number of entrants is determined by the equation $k + w = p_o Q_L(n + L_e, K)$. One can easily derive that $\frac{dL_e}{dp_o} = -\frac{Q_L(n + L_e, K)}{pQ_{LL}(n + L_e, K)}$ which is positive since $Q(L,K)$ is concave. The number of entrants is then positively related to the output price. When the wage system is egalitarian (insiders and entrants are equally paid), the number of entrants is determined by equation (12). Differentiating totally this equation with respect to L_e and p_o, leads to :

$$\left[Q_L(n + L_e, K) - \frac{Q(n + L_e, K)}{n + L_e} \right] dp_o = -p_o Q_{LL}(n + L_e, K) dL_e$$

The right-hand side is positive since $Q(L,K)$ is concave. Being in the region where $n < n_{D,}$ we know, by (12), that :

$$p_o Q_L(n + L_e, K) - \frac{p_o Q(n + L_e, K)}{n + L_e} = \frac{kn - rK}{n + L_e}$$

Then if $k\,n > r\,K$, the left-hand side is positive. Otherwise, the LHS is negative. Therefore, the impact of an increase of the output price on the number of entrants, in absence of two-tier contracts, depends on the importance of the cost of the capital. It will be negative if this cost is high, otherwise positive.

(iii) The intermediate case

If the firm is in the intermediate case and stays between these boundaries (according to the assumptions made, n_D or n_C and n_A or n_B) an increase of the output price does not change the employment level. Indeed, employing all the insiders and hiring no outsider is still the optimal solution.

But the boundaries shift following an increase of the output price. Therefore, regime shifts can be observed. It can easily seen that the boundaries, n_A, n_B, n_C move to the right. Therefore, when a two-tier system prevails, if the initial membership is higher than but sufficiently close to n_C the firm increases employment (instead of a status quo). In a sufficiently small neighborhood of n_A (resp., n_B), the employment level is completely unresponsive to output price increases. In the absence of a two-tier system, n_D (instead of n_C) is the relevant boundary. After an increase of the output price, n_D shifts to the left if $kn < rK$, otherwise to the right. Therefore, under the assumption of an egalitarian wage system and for an initial membership lower than but sufficiently close to n_D, the firm keeps employment unchanged or hires outsiders after an increase in the output price.

An important implication of this model is that the firm does not display a perverse supply behavior except in the case where $n < n_D$, insiders and entrants are equally paid and when $kn < rK$. In that case only, the firm hires less entrants when the output price increases. The intermediate zone is characterized by a status quo in employment (all insiders are employed and no outsiders enter the firm), the firm absorbing the shocks through income fluctuations. This was already noticed by Steinherr and Thisse (1979) and Spinnewyn and Svejnar (1990).

The dynamic model

Let us now deal with the so-called 'perverse response' to output price in steady state assuming that $k = 0$ (hence, $\varphi(L_i, L_e, 1) \equiv \phi(L_i + L_e)$).[18] As above, assume that the value-added function is $f(L_i + L_e) = p_o\, Q(L_i+L_e,K) - r\, K$ where p_o is the price of the (single) output, K is the exogenous level of the capital stock and $Q(L_i+L_e,K)$ is the concave production function. It is then easily seen that

$$\frac{d\phi(L_i+L_e)}{dp_0} > 0 \quad \text{and} \quad \frac{d\phi'(L_i+L_e)}{dp_0} \begin{matrix} >0 \\ <0 \end{matrix} \Leftrightarrow \frac{\partial Q}{\partial(L_i+L_e)} \begin{matrix} > Q/(L_i+L_e) \\ < Q/(L_i+L_e) \end{matrix}. \qquad \text{(B3)}$$

In steady state, from (18), $\dfrac{d\phi'(\frac{n}{1-q})}{dp_0} < 0$. Totally differentiating (18) with respect to n and p_0 yields

$$\left\{\frac{1+r}{(1-q)^2}\phi''(\frac{n}{1-q}) - \frac{U(\phi(\frac{n}{1-q}))}{n^2 U'(\phi(\frac{n}{1-q}))} + \frac{1}{n(1-q)}\left[1 - \frac{U(\phi(\frac{n}{1-q}))U''(\phi(\frac{n}{1-q}))}{U'(\phi(\frac{n}{1-q}))^2}\right]\phi'(\frac{n}{1-q})\right\}dn$$
$$= \left\{-\frac{1+r}{1-q}\frac{d\phi'(\frac{n}{1-q})}{dp_0} - \frac{1}{n}\left[1 - \frac{U(\phi(\frac{n}{1-q}))U''(\phi(\frac{n}{1-q}))}{U'(\phi(\frac{n}{1-q}))^2}\right]\frac{d\phi(\frac{n}{1-q})}{dp_0}\right\}dp_0 \qquad \text{(B4)}$$

whose left-hand side is negative (since $\phi'(\frac{n}{1-q}) < 0$ and $\phi''(\frac{n}{1-q}) < 0$). The right-hand side has however an ambiguous sign. From (B4), the sign of $\frac{dn}{dp_0}$ is > 0 (respectively, < 0) if

$$-\frac{1+r}{1-q}\frac{d\phi'(\frac{n}{1-q})}{dp_0} < \text{ (resp.>) } \frac{1}{n}\left[1 - \frac{U(\phi(\frac{n}{1-q}))U''(\phi(\frac{n}{1-q}))}{U'(\phi(\frac{n}{1-q}))^2}\right]\frac{d\phi(\frac{n}{1-q})}{dp_0}.$$

This implies that the 'perverse response' is not systematically observed. This 'perverse response' is more unlikely the more risk averse individuals are.

APPENDIX 3

The first-order conditions for maximizing Λ call for

$$\left.\begin{aligned}
&\frac{\partial \Lambda}{\partial x} \le 0, \quad x \ge 0, \quad x\frac{\partial \Lambda}{\partial x} = 0 \quad \text{for} \quad x = L_i, L_e, a_e, m \\
&\xi \ge 0, \quad \xi(n - L_i) = 0 \\
&\varsigma \ge 0, \quad \varsigma(1 - m) = 0 \\
&\lambda \ge 0, \quad \lambda(1 - a_e) = 0 \\
&\dot{n} = -qn + m(1-q)\left[L_i + L_e - n\right] \\
&\dot{\gamma} = r\gamma - \frac{\partial \Lambda}{\partial n}
\end{aligned}\right\} \qquad \text{(C1)}$$

where

$$\frac{\partial \Lambda}{\partial L_i} = U(\varphi(L_i, L_e, a_e)) - U(w) + L_i U'(\varphi(L_i, L_e, a_e))\varphi_1(L_i, L_e, a_e) + \gamma\, m(1-q) - \xi, \qquad \text{(C2)}$$

$$\frac{\partial \Lambda}{\partial L_e} = L_i U'(\varphi(L_i, L_e, a_e))\varphi_2(L_i, L_e, a_e) + \gamma\, m(1-q), \qquad \text{(C3)}$$

$$\frac{\partial \Lambda}{\partial m} = \gamma\,(1-q)\,(L_i + L_e - n) - \varsigma, \qquad \text{(C4)}$$

$$\frac{\partial \Lambda}{\partial a_e} = L_i U'(\varphi(L_i, L_e, a_e))\varphi_3(L_i, L_e, a_e) - \lambda, \qquad \text{(C5)}$$

$$\frac{\partial \Lambda}{\partial n} = U(w) - \gamma\left[m(1-q) + q\right] + \xi. \qquad \text{(C6)}$$

In these expressions, $\varphi_1 \equiv \frac{\partial \varphi}{\partial L_i}, \varphi_2 \equiv \frac{\partial \varphi}{\partial L_e}$ and $\varphi_3 \equiv \frac{\partial \varphi}{\partial a_e}$, where $\varphi(L_i, L_e, a_e)$ has been defined in (15). It is easily seen that $\varphi_1 \ge \varphi_2, \forall a_e \in [0,1]$, with a strict inequality if $k > 0$.

In steady state, $\dot{n} = 0$ and $\dot{\gamma} = 0$. The $\dot{n} = 0$ condition implies that $L_e = \frac{q}{1-q} n$ (see Section 5). Since in steady state $m = a_e = 1$, the equalities (C2) = 0 and (C3) = 0 can be used to rewrite the $\dot{\gamma} = 0$ condition as :

$$nU'(\varphi(n,\frac{qn}{1-q},1))\left[\varphi_1(n,\frac{qn}{1-q},1)+\frac{r+q}{1-q}\varphi_2(n,\frac{qn}{1-q},1)\right]+U(\varphi(n,\frac{qn}{1-q},1)) \quad = \quad 0. \qquad \text{(C7)}$$

After some manipulation, this equality leads to (18).

The dynamic behavior of system (15) can be derived the equation of motion (14) and from (C1), (C2) and (C6). Assume *k = 0.* In a neighborhood of a steady state,

$$\dot{\gamma}(t)=(r+q)\gamma(t)-U(\phi(n(t)+L_e(t)))+n(t)U'(\phi(n(t)+L_e(t)))\phi'(n(t)+L_e(t)). \qquad \text{(C9)}$$

Equating (C3) to zero yields an expression for $\gamma(t)$ which can be substituted in (C8). The latter becomes then :

$$\dot{Y}(t)=(1+r)\,Y+(1-q)\,U(\phi(n(t)+L_e(t))), \qquad \text{(C9)}$$

where *Y(t)* is a compact notation for $Y(n(t),L_e(t))$, with $Y(n(t),L_e(t))\equiv n(t)U'(\phi(n(t)+L_e(t)))\phi'(n(t)+L_e(t))$. Linearizing *Y(t)* around the steady state solution *(n, L_e)* allows to rewrite (C9) as :

$$\dot{L}_e(t)\cong\frac{1}{Y_2}\left\{\left[(1+q+r)Y_1+(1-q)U'(\phi(n+L_e))\phi'(n+L_e)\right]\left[n(t)-n\right]+\left[(r+q)Y_2\right]\left[L_e(t)-L_e\right]\right\} \qquad \text{(C10)}$$

where $Y_2=nU''(\phi(n+L_e))\left[\phi'(n+L_e)\right]^2+nU'(\phi(n+L_e))\phi''(n+L_e)<0$, since $U'>0, U''<0$, $\phi''(n+L_e)<0$ and $Y_1=Y_2+U'(\phi(n+L_e))\phi'(n+L_e)<0$. The $\dot{L}_e(t)=0$ locus is downward sloping. Figure 2 gives the phase diagram corresponding to (C10) and (14).

Up to now, we have neglected the transversality conditions. However, as the current-value Lagrange multiplier $\gamma(t)$ and the current-value Hamiltonian converge towards finite values, it is easily checked that the transversality conditions are satisfied.

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Table 1 : structure of Popular Economy : classification and examples (Source : Razeto and Calcagni, 1989).

	PEO	*Family businesses*	*Informal individual initiatives*	*Charitable initiatives*	*Illegal activities*
Life strategies	Self-managed workshops	Productive workshops	Taxi drivers	Housing organizations	Drug smuggling
Subsistence strategies	Food buyers' groups	Small retail stores	Small repairs	Beneficiaries of charity institutions	Clandest. alcohol selling
Survival strategies	Soup kitchens	Junk collection and resale	Street vendors	Begging	Small thefts

Table 2 : Distribution of initiatives by member status (Source: PET, 1992)

Type of relationship between members	*% Initiatives*
Communautarian	39,9
Associative	17,8
Family	33,8
Employer-employee	5,0
Others	3,5
Total	100

Figure 1. The static model.

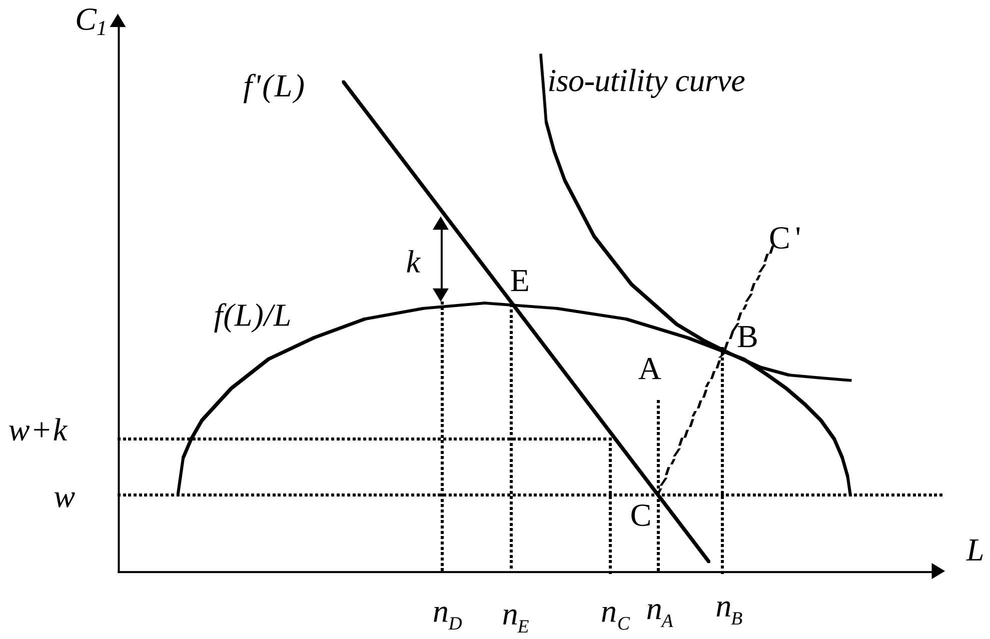


Figure 2 Dynamics of membership and employment of outsiders

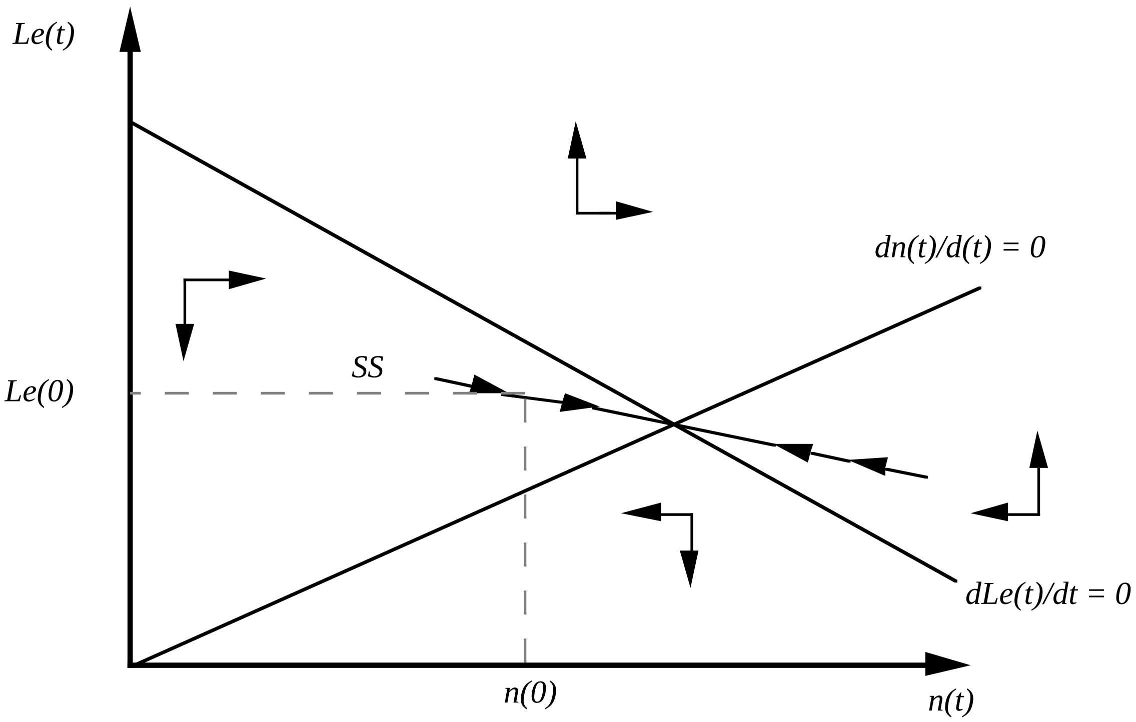
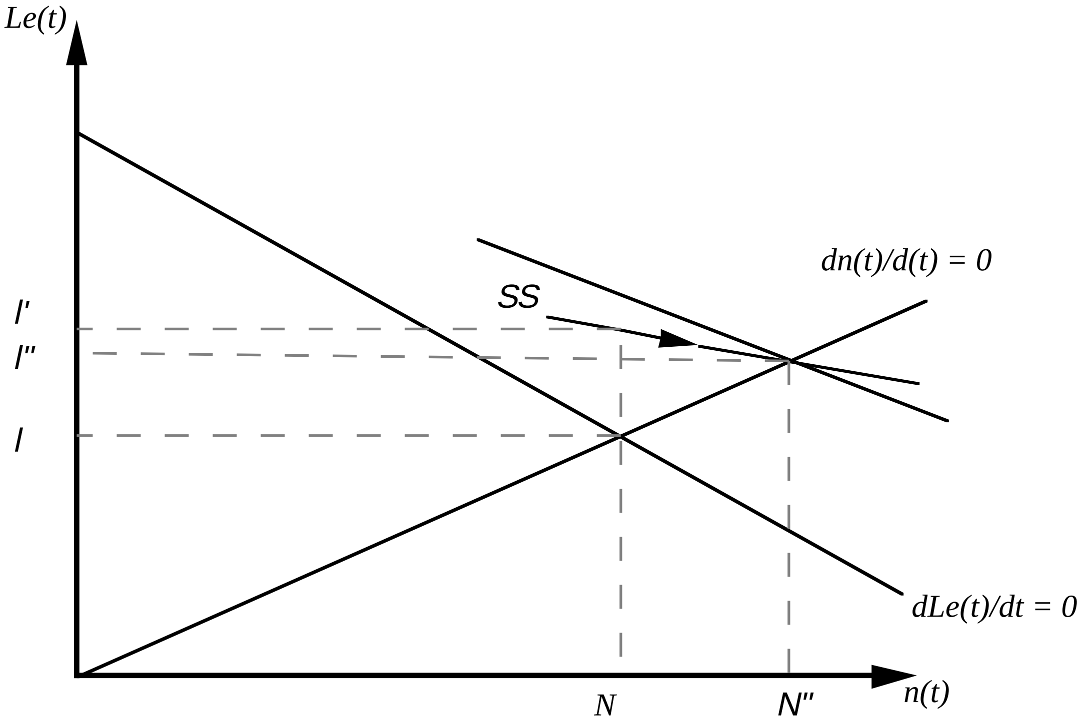


Figure 3. The effect of an increase in output price (the case wiyhout 'perverse response')



[1] See among others: Steinherrr and Thisse (1979), Brewer and Browning (1982), Bonin (1984), Kahana and Nitzan, (1989, 1993), Spinnewyn and Svejnar (1990).
[2] Resources are the means available in the environment for the setting of an economic activity : human and material capital but also "social" capital (networks of social relations, trust, social norms...); for a survey of this concept, see Harriss and De Renzio (1997).
[3] Various streams of economics have studied the influence of norms. For the economists of conventions (see e.g. Dupuy *et al* , 1989), norms take the form of 'conventions', i.e., regularities which flow from social interactions but appear to the actors in the form of an unquestionable constraint. For the 'new institutional economics' (see e.g. Willliamson, 1985, and North, 1986), norms are an agent's efficient answer to the problem of transaction costs in a context of imperfect information. A lot of arguments have been raised against this view. Authors like Elster (1989) or Granovetter (1992) have argued that norms are not outcome-oriented.
[4] These PEFs and popular economy initiatives receive different kind of support : credit facilities, consulting, advices,…
[5] 6% evaluate it to be neither good nor bad, 2% bad or very bad and 4% did not answer the question.
[6] Other analyses of various samples of LMFs reach the same conclusion (Bartlett *et al*, 1992). We are aware that the available observation is insufficient to test whether PEFs develop two-tiers contracts or not (since we do not have individual data with personal characteristics such as tenure and education).
[7] Along the same line, some empirical studies show that labor-managed firms have stronger links with the local community than PMFs (Bartlett *et al*, 1992).
[8] Due to a limited access to financial markets, the PEF cannot diversify risks. This model differs from the one of McCain (1985) in three ways. First, McCain considers the ex ante problem of a LMF facing a distribution of 'states of the world'. Put another way, his function *f* is state-contingent as in the standard implicit contract literature. Second, McCain rules out any risk-sharing between employed and laid-off insiders. Third, he endogeneizes the number *n* of members in a static setting (in section 5, we deal with this issue in a dynamic one).
[9] The connection between LMF and unionized PMF was first highlighted by Law (1977).

[10] It should be noticed that less simple conclusions would be reached in the case of a more general utility function (see Rosen, 1985, in a related context).

[11] This is true because *f* is concave and *w* is assumed to be lower than the maximum possible value-added per worker. These hypotheses imply that the point $(f'^{-1}(w), w)$ is on the right of the maximum of the value-added per worker function. In that region, it can be easily seen that (7) is positive.

[12] An interior solution could be found if the cost of cooperation was not proportional to the product $a_e.L_e$. This result would still be at variance with the one obtained in the model of a PMF developped by Lindbeck and Snower (1988).

[13] Because *f* is concave, this is true if $w+k< max\ (f(L)/L)$, i.e. for sufficiently low values of *k*.

[14] Instead of opposing the case with layoff payments under symmetric information and the case without such compensation, we could have compared the former and the case with layoff payments but asymmetric information. The basic conclusion that income and the allocation of labor are different would have typically been unchanged (see Rosen, 1985, or Blanchard and Fischer, 1989, in the context of PMFs).

[15] This quit rate is not endogeneized here since this analysis does not focus on the determinants of the underlying phenomena.

[16] It is implicitly assumed that in each period entrants are actually newcomers who needs some costly cooperation from the insiders in order to become productive. Furthermore, it is implicitly assumed that an entrant agrees to become a member if $m(t) > 0$. As long as $C(t) > w$, this is certainly the case for it will turn out that nobody is fired along the path towards the steady state as soon as outsiders enter the PEF.

[17] For the equivalent result in a PMF, see Huizinga and Schiantarelli (1992). If we take the limiting and less realistic case of no quits, the full range of equilibria found in the static case are steady states of the model.

[18] Relaxing this assumption of zero cooperation costs leads to rather complicate expressions and an ambiguous net effect of the output price on the steady state employment level.